

Claims

1. In a data collection system,
a hand held computerized data collection terminal having user interface means providing for interaction with a user of the terminal during data collection operation, said terminal having computer processor means and control circuitry connected with said user interface means and with said computer processor means for controlling operation of said terminal, said terminal having a battery pack removably secured therewith and supplying operating power to said computer processor means and said control circuitry, said battery pack having an electrically conductive short-circuit element mounted thereon for enabling sensing of the presence of the battery pack, and said terminal having element sensing means switchable between a charging circuit enabling condition and a charging circuit disabling condition in dependence upon the presence of a battery pack with the element and the presence of a battery pack without such an element, respectively.
2. In a data collection system according to claim 1, said terminal having a battery compartment for removably receiving said battery pack, and said element sensing means comprising a pair of conductive probes arranged to be conductively bridged by the electrically conductive short-circuit element as the battery pack is inserted into said battery compartment.
3. In a data collection system according to claim 2, said terminal having a battery charging circuit including said pair of conductive short-circuit probes such that the battery charging circuit is completed by the electrically conductive short-circuit element of said battery pack and would be open if a battery pack without said electrically conductive short-circuit element were inserted into said battery compartment, said battery pack with said electrically conductive element being a rechargeable battery pack which can safely receive charging current via said battery charging circuit.
4. In a data collection system according to claim 2, said terminal comprising a bottom terminal part providing a bottom wall and side walls of said battery compartment, a battery compartment wall extending above the bottom wall to define an upper boundary of said battery compartment, and said probes being mounted at the battery compartment wall of said battery compartment.

5. In a data collection system according to claim 4, said bottom terminal part having a partition wall providing an inner boundary of said battery compartment, a battery supply connector being mounted at the side of said partition wall external to said battery compartment, and being
5 connected with the battery pack in said battery compartment, and a host circuit carrying member having the computer processor means thereon and extending within the terminal at a level just above the battery compartment wall and coupled with the battery supply connector so as to provide for the supply of battery power to the computer processor means.

10 6. In a data collection system according to claim 5, a peripheral device circuit carrying member disposed in said bottom terminal part on the opposite side of the partition wall from the battery compartment, said peripheral device circuit carrying member having a connector receptacle with a memory card therein, and said bottom terminal part having an opening at
15 one end providing access to said battery compartment and having an insertion slot at an opposite end accommodating insertion of said memory card into said connector receptacle.

20 7. In a data collection system according to claim 6, said peripheral device circuit carrying member having peripheral device coupling means accessible through the opposite end of the bottom terminal part, and a removable end cap covering the opposite end of the bottom terminal part and having a peripheral device connector releasably connected with said peripheral device coupling means.

8. In a data collection system,

a hand held computerized data collection terminal having user interface means providing for interaction with a user of the terminal during data collection operation, said terminal having computer processor means and control circuitry connected with said user interface means and connected with said computer processor means for controlling operation of said terminal, said terminal having a battery pack removably secured therewith and supplying operating power to said computer processor means and said control circuitry, said terminal having first and second circuit carrying members mounted therein, and having respective first and second sets of generally parallel spaced apart connector elements thereon, a resilient elongated member positioned between the first and second sets of connector elements and having a plurality of generally parallel conductive elements embedded therein in spaced apart relation and electrically connecting respective individual connector elements of the first and second sets.

9. In a data collection system according to claim 8, said first circuit carrying member being a keypad printed circuit board and said second circuit carrying member being a display printed circuit board, an edge of the keypad printed circuit board having said first set of connector elements spaced therealong, and an edge of the display printed circuit board being disposed in overlapping relation to the edge of the keypad printed circuit board and having the second set of connector elements spaced therealong and respectively aligned with the connector elements of the first set and the respective conductive elements of the resilient elongated member, said resilient elongated member being compressed between the circuit boards.

10. In a data collection system

a hand-held computerized data collection terminal having user interface means providing for interaction with a user of the terminal during data collection operation, said terminal having computer processor means and control circuitry connected with said user interface means and with said computer processor means for controlling operation of said terminal, said terminal having rechargeable battery means removably received therewith and supplying operating power to said terminal, and said control circuitry including detection means to detect a short circuit due to the presence of rechargeable battery means for supplying operating power to said terminal.

11. In a data collection system according to claim 10, said control circuitry including battery charging control means controlling supply of battery charging current to rechargeable battery means received by the terminal, said detection means serving to enable said battery charging control means when the presence of rechargeable battery means is detected and serving to disable said battery charging control means when non-rechargeable battery means are received by said terminal for supplying operating power thereto.

12. In a data collection system according to claim 10, said terminal having a wall defining a boundary of a battery receiving chamber receiving said battery means, and said detection means comprising a pair of spaced electrically conductive probe elements disposed upon said wall of said battery receiving chamber, said pair of probe elements being differentially responsive to insertion of rechargeable battery means and non-rechargeable battery means into said battery receiving chamber by virtue of one type of such battery means carrying an electrically conductive short-circuit element for electrically bridging said probe elements.

13. In a data collection system, a hand-held computerized data collection terminal having user interface means providing for interaction with a user of the terminal during data collection operation, said terminal having computer processor means and control circuitry connected therewith for controlling operation of said terminal, said terminal having battery means for supply of operating power to said computer processor means and said control circuitry, said terminal comprising a terminal housing having a housing end portion with peripheral device electrical connector means therein accessible from the exterior of said housing end portion, an end cap releasably engaged with said housing end portion, and peripheral device circuit means electrically coupled with the peripheral device electrical connector means and protectively enclosed by said end cap,

said peripheral device circuit means having a peripheral device electrical connector fitting accessible at the exterior of the end cap and coupled with said computer processor means via said peripheral device circuit means for providing data communication with a peripheral device.

14. In a data collection system according to claim 13, said terminal having external conductive metal pads at an end thereof remote from said end cap and coupled with said computer processor means for the transmission of data at a substantially higher rate than the data communication provided via said peripheral device electrical connector fitting.

15. In a data collection system according to claim 14, communication circuit means coupled between said computer processor means and said external conductive pads and providing for two-way transmission at a rate of about 500,000 bits per second.

16. In a data collection system according to claim 14, circuit means coupled between said computer processor means and said peripheral device electrical connector fitting and providing for data communication at a rate of not more than about 19,200 bits per second.

17. In a data collection system, a hand-held computerized data collection terminal having user interface means providing for interaction with a user of the terminal during data collection operation, said terminal having computer processor means and control/circuitry connected therewith for controlling operation of said terminal, said terminal having battery means for supply of operating power to said computer processor means and said control circuitry, said terminal comprising a terminal housing having a housing end portion with peripheral device electrical connector means therein accessible from the exterior of said housing end portion, an end cap releasably engaged with said housing end portion, and peripheral device circuit means electrically coupled with the peripheral device electrical connector means and protectively enclosed by said end cap,

said peripheral device circuit means comprising a peripheral device electrical connector fitting at the exterior of the end cap, said terminal housing containing a peripheral device circuit carrying member mounting said peripheral device electrical connector means for automatic engagement with the peripheral device circuit means as the end cap is applied to said housing end portion.

18. In a data collection system, a hand-held computerized data collection terminal having user interface means providing for interaction with a user of the terminal during data collection operation, said terminal having computer processor means and control circuitry connected therewith for controlling operation of said terminal, said terminal having battery means for supply of operating power to said computer processor means and said control circuitry, said terminal comprising a terminal housing having a housing end portion with peripheral device electrical connector means therein accessible from the exterior of said housing end portion, an end cap releasably engaged with said housing end portion, and peripheral device circuit means electrically coupled with the peripheral device electrical connector means and protectively enclosed by said end cap,

said peripheral device circuit means comprising a memory card removably inserted into the peripheral device electrical connector means, and removable from the housing end portion upon disengagement of the end cap from said housing end portion.

19. In a data collection system according to claim 18, said terminal housing containing a memory card controller board with said peripheral device electrical connector means thereon and arranged to automatically electrically connect with an edge of the memory card as the memory card is inserted into the housing end portion with the end cap disengaged therefrom.

20. In a data collection system, a hand-held computerized data collection terminal having user interface means providing for interaction with a user of the terminal during data collection operation, said terminal having computer processor means and control circuitry connected therewith for controlling operation of said terminal, said terminal having battery means for supply of operating power to said computer processor means and said control circuitry, said terminal comprising a terminal housing having a housing end portion with peripheral device electrical connector means therein accessible from the exterior of said housing end portion, an end cap releasably engaged with said housing end portion, and peripheral device circuit means electrically coupled with the peripheral device electrical connector means and protectively enclosed by said end cap,

said housing end portion having auxiliary battery means for supplying backup operating power to the terminal along an electric current flow path and an insulating strip of electrical insulating material extending into said housing end portion from the vicinity of said end cap for maintaining the electric current flow path in an open circuit condition until the insulating strip is manually pulled to a non current flow interrupting position by manual gripping of a portion of the insulating strip normally covered by the end cap.

21. In a data collection system according to claim 20, said auxiliary battery means having an electrically conductive clip arranged for electrically contacting said auxiliary battery means and having an end of said insulating strip interposed between the auxiliary battery means and said clip for preventing the electrical contact between said clip and said auxiliary battery means until such time as said insulating strip is pulled to a non current flow interrupting position.

22. In a data collection system,

a hand-held computerized data collection terminal having user interface means providing for interaction with a user of the terminal during data collection operation, said terminal having computer processor means and control circuitry connected with said user interface means and with said computer processor means for controlling operation of said terminal, said terminal having main battery means for supplying operating power to said terminal, terminal memory means normally supplied with operating power from said main battery means, auxiliary stand-by battery means for supplying electric power to said terminal memory means as a back up to said main battery means, said auxiliary stand-by battery means having an auxiliary current flow path for supplying current to the terminal memory means when needed, and an insulating strip of electrical insulating material inserted into the auxiliary current flow path to prevent depletion of the auxiliary stand-by battery means prior to use of the terminal, said terminal comprising a terminal housing having an access opening accommodating manual removal of the insulating strip from the auxiliary current flow path, and a closure cap for removable attachment to said terminal housing and enclosing said access opening when attached to said terminal housing.

23. In a data collection system according to claim 22, said terminal having an electrically conductive retaining clip overlying the auxiliary stand-by battery means, and said insulating strip being disposed between the clip and the auxiliary stand-by battery means for preventing current flow from the auxiliary stand-by battery means until said insulating strip has been removed from between said clip and said auxiliary stand-by battery means.

24. In a data collection system according to claim 22, said terminal having a terminal housing with an end wall accessible to the user, said end wall having an opening therein, and said insulating strip having a free end extending through said opening to the exterior of said end wall so as to be accessible to a user for manually withdrawing said insulating strip from the auxiliary current flow path to place said auxiliary current flow path in condition for supplying current to the terminal memory means when needed.

25. In a data collection system, a hand-held computerized data collection terminal comprising:

(a) user interface means providing for interaction with a user of the terminal during data collection operation;

5 (b) computer processor means and control circuitry connected therewith for controlling operation of said terminal;

(c) battery means for supply of operating power to said computer processor means and said control circuitry;

10 (d) a terminal housing having a housing end portion at an end of said terminal housing; and

(e) an end cap which may be releasably and selectively engaged with said end of said terminal housing for cooperation therewith to adapt said data collection system to a plurality of configurations.

15 26. A data collection system as recited in claim 25, wherein a selected one of said end caps comprises a cover for protectively enclosing said housing end portion.

27. A data collection system as recited in claim 25, wherein a selected one of said end caps comprise an RF module for communication with an external peripheral device.

20 28. A data collection system as recited in claim 25, wherein a selected one of said end caps contains peripheral device electrical connector means therein for communication with an external peripheral device.

25 29. A data collection system as recited in claim 25, wherein a selected one of said end caps comprises an optically readable information reader.

30. A data collection system as recited in claim 25, wherein said computer processor means includes data processing means for processing data from a plurality of data devices.

31. In a data collection system, a hand-held computerized data collection terminal comprising:

- (a) a user interface providing for interaction with a user of the terminal during data collection operation;
- 5 (b) computer processor and control circuitry connected with said user interface for controlling operation of said terminal;
- (c) battery means for supply of operating power to said computer processor and control circuitry;
- 10 (d) a terminal housing having a housing end portion having an access opening; and
- (e) an end cap releasably and connectively engaged with said housing end portion and containing a memory device for coupling to said computer processor and control
15 circuitry.

32. A data collection system as recited in claim 31, wherein said end cap forms a cover for positively enclosing said access opening of said housing end portion and said memory device.

20 33. A data collection system as recited in claim 31, wherein said end cap contains an RF module for communication with an external device.

34. A data collection system as recited in claim 31, wherein said end cap further comprises a peripheral device electrical connector therein accommodating electrical connection with said battery to accommodate coupling of said battery with a device external to said end cap.

25 35. A data collection system as recited in claim 31, wherein said end cap and accommodating electrical connector provide for coupling between said computer and control circuitry and a device external to the end cap via a cable.

36. In a data collection system, a hand-held computerized data collection terminal having user interface means providing for interaction with a user of the terminal during data collection operation, said terminal having computer processor means and control circuitry connected therewith for controlling operation of said terminal, said terminal having battery means for supply of operating power to said computer processor means and said control circuitry, said terminal comprising a terminal housing end portion with peripheral device electrical connector means therein accessible from the exterior of said housing end portion, an end cap releasably engaged with said housing end portion, and peripheral device circuit means electrically coupled with the peripheral device electrical connector means,

said peripheral device circuit means having a peripheral device electrical connector fitting accessible at the exterior of the end cap and coupled with said computer processor means via said peripheral device circuit means for providing data communication with a peripheral device,

said peripheral device electrical connector means being coupled with said computer processor means via said peripheral device circuit means,

said end cap being removable from the housing end portion for operative access to said peripheral device electrical connector means to enable a peripheral coupling to be received by said peripheral device electrical connector means thereby to provide peripheral access to said computer processor means via said peripheral device circuit means.

37. In a data collection system according to claim 36, said end cap being clear of any connector components.

38. In a data collection system according to claim 37, said peripheral device electrical connector means having a cavity frontally thereof for accommodating a peripheral coupling, said end cap overlying said cavity.

39. In a data collection system according to claim 36, said peripheral device electrical connector means having a cavity frontally thereof for accommodating a peripheral coupling, said end cap overlying said cavity.

40. In a data collection system according to claim 39, said end cap protectively enclosing said cavity.

41. In a data collection system according to claim 36, said peripheral device electrical connector means having electrical conductor means, and a peripheral device contact means being insertable into engagement with the electrical conductor means of said peripheral device electrical connector means with the end cap removed from said housing end portion.

42. In a data collection system according to claim 37, said peripheral device electrical connector means having electrical conductor means, and a peripheral device contact means being insertable into engagement with the electrical conductor means of said peripheral device electrical connector means with the end cap removed from said housing end portion.

43. In a data collection system according to claim 36, said peripheral device electrical connector means having electrical conductor means connecting with said peripheral device circuit means, and having an access space providing access to said electrical conductor means and peripheral device means insertable into the access space when the end cap is removed from said housing end portion and having contact means for coupling with said electrical conductor means so as to provide for communication with the computer processor means via said peripheral device circuit means.